METALS POLYMERS CERAMICS

U.S. Navy ship *New York* contains steel from ground zero

With a bow fashioned in part with 7.5 tons of steel reclaimed from the wreckage of the World Trade Center, the Navy's newest and perhaps most symbolic warship was christened on March 1 at Northrop Grumman Shipbuilding's shipyard in Avondale, La.

The San Antonio-class amphibious transport dock ship is named the *New York*, a tribute to the victims of the terrorist attacks on Sept. 11, 2001. As crews cleaned up the World Trade Center site in lower Manhattan, large pieces of salvageable steel were loaded on flatbeds and delivered to a Gulf Coast foundry in Amite, La. There, it was melted and formed into a part of the ship's bow stem, the foremost section of the hull on the water line. The 684-foot-long ship will be commissioned in New York in 2009 and based in Norfolk as part of the Atlantic Fleet.

For more information: Northrop Grumman Shipbuilding, Avondale, LA 70094; www.ss.northropgrumman.com/christenings/NewYork; www.ussnewyork.com; www.navy.mil.

Steel sections 44 inches deep produced for highway bridges

Nucor-Yamato Steel Company, a joint venture between Nucor Corporation and Japan's Yamato Kogyo Company, is introducing four 44-inch deep sections: W44x335, W44x290, W44x262, and W44x230. The maximum length for these sections is 120 feet. The first production rolling of the W44 sections is scheduled for the week of May 25, and will be included in future rolling schedules.

These beams are of particular interest to the highway bridge market for service as "stringers" (primary bridge beams), horizontal load carrying members that carry the bridge deck and roadway surface.

Until now, the deepest sections available from U.S. mills had been Nucor-Yamato's W40x431 sections. The W40 sections and other deeper rolled beams have been applied more frequently in bridges, particularly in the Midwest. Some highway departments, such as the Kansas Department of Transportation, have used Nucor-Yamato Steel deep rolled beams since the mid-1990s.

The new SSAB Domex 1200 hot-rolled, ultra-high-strength structural steel from strip offers crane manufacturers around the world new opportunities for producing strong crane booms.

For more information: Nucor Steel, 1915 Rexford Road, Charlotte, NC 28211; tel: 704/366-7000; www.nucor.com.

Ultra-high-strength hot-rolled steel withstands high stresses

A steel developed for slender structures such as cranes, which must be capable of withstanding very high stresses, has been announced by SSAB Tunnplat, Sweden. Called Domex 1200, it has a minimum yield strength of 1200 MPa (174 ksi) and good machining and welding properties. In spite of its high strength, the steel can be bent to tight radii. The material has a low content of alloying elements, is very pure, and is produced in a meticulously controlled process, says the company.

Domex 1200 is available in a strip width of 1500 mm

BRIEFS

Alcoa Inc. has acquired **Republic Fastener Manufacturing Corp.** and **Van Petty Manufacturing** from the **Wood Family Trust.** Republic offers a wide variety of sheet metal and wrenchable aerospace fasteners. Van Petty produces high-performance precision aerospace fasteners.
www.alcoa.com

The International Titanium Association is accepting applications for its second annual "Titanium Applications Development Award." The deadline to submit applications is June 30th.
www.titanium.org

Kuraray America Inc. has available Vectran fiber, said to be three to five times stronger than polyesters and up to 20% stronger than aramid fibers, with high abrasion resistance, flex-fatigue endurance, dimensional stability, and chemical and heat resistance.
www.vectranfiber.com

Raymor Industries Inc. is a leading developer and producer of single-walled carbon nanotubes, nanomaterials, and advanced materials. Its wholly owned subsidiary, **Raymor Aerospace Inc.**, has purchased **SE Techno Plus Inc**., a company specializing in manufacturing, repair, and precision grinding with super finishing of industrial and aerospace components.
www.raymor.com

Sunrock Ceramics Co. LLC offers a new high-performance alumina pusher plate for hydrogen atmosphere high-temperature sintering furnaces. The HPA-CG material has been tested and qualified for production by leading furnace manufacturers and PM parts makers. www.sunrockceramics.com

Volvo Aero has developed a new jet engine fan frame concept that utilizes lightweight carbon-fiber composite material. The concept has the potential to save 30% in weight compared with cast titanium, and a full-scale fan frame prototype is now being manufactured. www.volvo.com

Large carbon nanotube sheets made via continuous processing

Sheets of carbon nanotubes that are three by six feet in size have reportedly been fabricated in a continuous process by Nanocomp Technologies Inc., Concord, N.H. This production milestone gives Nanocomp the ability to generate the largest cohesive sheets of nanotube material ever produced.

At the core of Nanocomp's process is a breakthrough technology for continuous, high-volume output of millimeter-long, high-purity carbon nanotubes that efficiently conduct both heat and electricity. By bringing this technology to practice via proven, scalable industrial processes, Nanocomp can now produce sheets of material at contiguous sizes of tens of square feet.

In contrast to these millimeter-long nanotubes, other carbon nanotubes are short—tens of microns long—and are usually delivered in powder form. Short nanotubes have limited industrial uses because they are difficult to incorporate into existing manufacturing processes and do not possess the high-performance properties of long carbon nanotubes.

For more information: John Dorr, Nanocomp Technologies Inc., 162 Pembroke Road, Concord, NH 03301; tel: 603/442-8992 ext. 104; jdorr@nanocomptech.com; www.nanocomptech.com.

in thicknesses between 4 and 8 mm. SSAB has produced a wide range of test sheets that can be ordered in various fixed lengths between 3 and 12 meters.

For more information: Anders Sörman, SSAB Tunnplåt AB, Sweden; tel: 46 243 710 80; fax: 46 243 720 00; anders.sorman@ssab.com; www.ssabtunnplat.com.

Aluminum-rich alloy splits water to produce hydrogen

A new aluminum-rich alloy that produces hydrogen by splitting water, and which is said to be economically competitive with conventional fuels for transportation and power generation, is under development by researchers at Purdue University, West Lafayette, Ind. When immersed in water, the alloy reportedly splits water molecules into hydrogen and oxygen. The oxygen immediately reacts with aluminum to produce aluminum oxide, which can be recycled back into aluminum. The new alloy contains 95% aluminum and 5% of an alloy of gallium, indium, and tin. Because it contains significantly less of the more expensive gallium than previous forms of the alloy, hydrogen can be produced less expensively.

"After recycling the aluminum oxide back to aluminum and the inert gallium-indium-tin alloy only 60 times, the cost of producing energy both as hydrogen and heat using the technology would be reduced to ten cents per kilowatt hour, making it competitive with other energy technologies," says Prof. Jerry Woodall.

For more information: Jerry Woodall, Purdue University, West Lafayette, IN 47907; tel: 765/494-3479, woodall@dynamo.ecn.purdue.edu; www.purdue.edu.

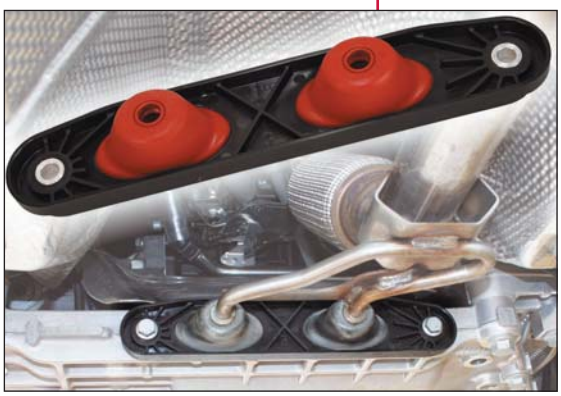
Ultra-high-strength stainless also has good formability

A new stainless steel in which ultra-high strength is combined with good formability, corrosion resistance, and a good surface finish has reportedly been developed by Sandvik Materials Technology, Sweden. Called Sandvik Nanoflex, it is ideally suited to mechanical applications requiring lightweight, rigid designs. A high modulus of elasticity combined with extreme strength can result in thinner and even lighter components than those made from aluminum and titanium.

The ultimate tensile strength (1700 MPa/246 ksi) and surface properties also offer opportunities for automotive components, replacing hard-chromed low alloy steels. Thus, the environmentally unfriendly hard-chromizing process can be eliminated. Furthermore, the precision hollow bar delivery condition implies a major cost-saving benefit for slot-drilled components.

Despite a high hardness (45 to 58 HRC), Sandvik Nanoflex displays excellent forming properties. Cold forming operations such as bending, cutting, turning, and grinding are easy to do. After reaching the proper shape, a simple low-temperature heat treatment gives the material its high strength without distorting the work piece.

For more information: Sandvik Materials Technology, SE-81181 Sandviken, Sweden; tel: 46 26-26 00 00; www.smt.sandvik.com/nanoflex.



Reinforced nylon replaces metal in exhaust system part

Reinforced Zytel nylon resin has replaced steel in exhaust system parts such as a bracket on all Volkswagen vehicles built on the current Golf platform, cutting weight of the component by nearly 50%, says DuPont Engineering Polymers, Wilmington, Del.

The new bracket must withstand dynamic forces, chemical exposure, and high temperatures. In addition to the nearly 50% weight reduction, the all-plastic design also makes possible more efficient, one-step assembly. The bracket, which experiences temperatures up to 175°C

(350°F) due to its proximity to the engine, was previously a complex metal/rubber part that required multiple assembly steps.

For more information: Carolyn Davies, DuPont Automotive, Troy, MI 48083; tel: 248/583-8112; Carolyn.a.davies@usa.dupont.com; http://www2.dupont.com/Automotive/en_US.

Engine torque rods made of reinforced nylon

The first engine torque rod made of plastic that can withstand high mechanical loads has been announced by BASF together with system supplier ContiTech Vibration Control, a business division of Continental AG. The torque rod serves to secure the vehicle engine and transmission assembly as well as to damp vibrations and to insulate structure-borne noise. Up to now, highly loaded components such as engine mounts, gear mounts, and torque rods have been made exclusively of aluminum or steel.

To design the part, BASF applied its new polyamide Ultramid A3WG10 CR together with its expanded modeling software, Integrative Simulation. The part weighs 35% less than its aluminum predecessor, and has gone into serial production for the Opel Vectra and Saab 9 3.

The engine mount system is the primary connection member between the engine/transmission unit and the car body. In addition to high loads, these systems are exposed to temperatures ranging from –30 to 120°C (–22 to 248°F) as well as to contamination by oils and other chemicals.

For more information: BASF, Germany; tel: +49 621 60 78780; Ultraplaste.infopoint@basf.com.

Alumina-reinforced polymer has high strength, flexibility

Tiny platelets of aluminum oxide have reportedly been dispersed in a polymer to make a material that is tough, flexible, and lightweight by researchers at the Swiss Federal Institute of Technology, Zurich. A film of the composite is said to be as strong as aluminum foil, but if stretched, it can expand by up to 25%, whereas aluminum foil would break at 2%.

To assemble the material, the researchers disperse aluminum oxide platelets in ethanol and spread the mixture over water. The platelets arrange themselves into a single layer on the surface of the water, and the layer is transferred to a glass plate. Then a layer of the biocompatible polymer chitosan is deposited on top of the platelets. The process is repeated until the thickness of the final composite is a few tens of micrometers, and the material is peeled off the glass plate.

For more information: Ludwig Gauckler, Swiss Federal Institute of Technology Zurich, Switzerland; 41 44 632 56 46; ludwig.gauckler@mat.ethz.ch; www.arch.ethz.ch.